# aico

# A Guide to Residential Fire Detection

## With Reference to BS 5839: Pt.6: 2004

Ahead on Quality
Ahead on Performance
Ahead on Features

**Ei Professional** ®

# Contents

## Ei ELECTRONICS - THE MANUFACTURER

Ei Electronics is Europe's largest and most experienced manufacturer of residential smoke and heat alarms. The company has built up a wealth of experience over more than 30 years and is now by far the UK's leading supplier of smoke alarms for residential use, as well as the first choice supplier for local authorities and housing associations throughout the UK.

Ongoing commitment to research and development has enabled Ei Electronics to achieve many significant industry firsts: it was first to obtain the BSI Kitemark on the entire range of harmonised 9 Volt and mains powered smoke alarms; first to offer rechargeable back-up power; and first to develop a fully compatible mains powered heat alarm, as well as a range of ancillary products. The company also became the first to offer 'hush' button technology - as recommended by BS 5839: Pt.6 - across the full spectrum of alarm types; the first to offer uniquely simplified installation and maintenance through its patented 'Easi-fit' designs; and the first to offer private landlords and local authorities a low cost alternative to panel systems in some HMO applications through its innovative 'Modifire' modular system. Most recently, Ei has become the first company to introduce mains powered wireless interconnect bases for smoke alarms through its innovative RadioLINK range, offering major savings on time and installation costs.

Furthermore, Ei Electronics is the only manufacturer to have responded positively to the need to protect more vulnerable members of the community - again, as raised in BS 5839: Pt.6 - by manufacturing a range of harmonised products for the deaf and hearing impaired.

Ei Electronics continues to launch new products utilising the latest technology and bringing other significant innovations into the market place and currently offers the largest range of residential mains powered fire detection products in the UK.

## AICO - THE SPECIALIST SUPPLIER

Many years of experience in both its professional management and technical sales support teams, coupled with a high standard of service and back-up, have enabled Aico to firmly establish the Ei Professional range of fire detection products as the first choice for specifiers, installers, housing associations, local authorities and builders throughout the UK.

In-house technical support continues to play a very vital role, together with a dedicated ongoing education process for wholesalers, specifiers and installers. Aico is also fully committed to an ongoing programme of total product awareness, demonstrating the need for effective fire detection and providing guidance on all aspects of system design, installation and maintenance through seminars, professional videos, CD-ROMs and support literature.

High quality products demand a high standard of service and support. Making it as easy as possible for customers to buy "what they want - when they want" is another priority, and high levels of stock (plus a rapid delivery service to wholesale distributors) is a further demonstration of Aico's total commitment to the fire safety industry.

Aico Ltd is a wholly owned subsidiary of Ei Electronics, Europe's leading manufacturer of residential smoke alarms and accessories.

# INTRODUCTION

When first introduced in 1995, the BS 5839: Pt.6 Code of Practice became the most important set of recommendations ever made on fire safety in the home.

It had an immediate impact on architects, system designers, installers and landlords in the private or public sector, all of whom were required to familiarise themselves with these important recommendations. Landlords in particular needed to abide by these recommendations, as legal liability with regard to 'duty of care' would undoubtedly become a serious issue should a fire occur in an inadequately protected property.

In short, BS 5839: Pt.6 became the essential guide to providing adequate fire protection in all dwelling types.

In September 2004, the Code of Practice was extensively revised and updated by the publication of BS 5839: Pt.6: 2004 and immediately superseded BS 5839: Pt.6: 1995, which is now withdrawn. The changes therein are important and need to be fully understood and appreciated by all those with responsibility for fire safety in domestic dwellings.

This document is intended as a guide to BS 5839: Pt.6: 2004, highlighting the changes that have come into effect with the introduction of the 2004 edition while still remaining a comprehensive guide to BS 5839 as a whole.

This guide is not intended as a substitute for reading the Code of practice itself. Instead, it's designed to help make the implications and recommendations of BS 5839: Pt.6 more clearly understood, and to offer advice on how to design, install and maintain a system that meets the requirements, with reference to the 2004 amendments.

At the same time, this guide is designed to help answer the most commonly asked questions about fire detection; for example, 'which types of detector to use and where not to use them', and to help dispel the myth that alarms are all the same. They are not, as the Code itself is all too anxious to point out.

This latest edition of the Guide has been produced to take on board new developments since the introduction of the Code, both in terms of fire statistics and evolving fire safety technology.

# FIRE SAFETY - THE STATISTICS

According to the latest UK figures the majority - over three quarters - of all fire casualties occur in the home.

Until the introduction of BS 5839: Pt.6, business and commercial premises were the subject of far more stringent fire safety regulations than residential dwellings. BS 5839: Pt.6 was introduced to start redressing the balance.

Every year around 450 people die in fires in this country, and close to 13,000 are injured. The death toll is reducing and this is acknowledged to be directly related to increasing and more professional use of smoke alarms. At the time of the introduction of BS 5839 in 1995, we were talking around 600 deaths and 15,000 annual injuries.

A brief look at 'Fire Statistics United Kingdom, 2003', published by the Office of the Deputy Prime Minister in March 2005, provides an invaluable insight into incidents of dwelling fires and the effectiveness of smoke alarms.

- In 2003, dwelling fires fell to 63,800. The number of accidental dwelling fires also fell to 50,000 – the lowest figures for more than a decade
- However, around 80% of all fire-related casualties occur in dwellings
- In 2003, 447 people lost their lives in fires in the home. (That compares with 430 in 2002 and 483 in 2001)
- 12,600 people were injured, a reduction of 7% compared with 2002

## MORTALITY STATISTICS

- In 2003, 68 people lost their lives in fires in homes where an alarm was present, operated and raised the alarm

- In comparison, in the same period, 379 people died in homes where either an alarm was not installed or an alarm was present but failed to raise the alarm

The report suggests that 76% of households now have alarms, so the huge difference in death rates is strongly indicative not only of the need for smoke alarms, but also smoke alarms which work when they are needed.

Further evidence of the vital importance of smoke alarms comes from American studies. In American States where residential fire protection is mandatory, some 92% of homes have the required fire alarm systems. 50% of ALL the fire deaths which occur happen within the 8% where no alarms are fitted.

BS 5839: Pt.6: 2004 itself says:
"It has been estimated that, in dwellings without smoke detectors, a substantial proportion of the fatalities from fire could be avoided if smoke detectors were installed"

## SMOKE ALARM PERFORMANCE

In 34,450 fires in 2003, no smoke alarm was present in the fire area. 261 people died in these fires, and a further 6,100 were injured.

In the cases where an alarm was present, the alarm operated correctly in 18,821 cases (29% of dwelling fires), operated but failed to raise the alarm in 3,100 cases (5%) and failed to operate altogether in 7,445 cases (12%).

## SMOKE ALARM RELIABILITY

It is worth quoting the Fire Statistics in detail here. The report notes that, in those dwellings subject to a fire in 2003, alarms failed to operate in 12% of cases:
"However, this overall figure masks a wide difference in performance between battery powered alarms and mains powered alarms – 40% of all battery powered smoke alarms failed in 2003 compared to just 13% of mains powered alarms."

The Report goes on to clarify:
"The main reason for smoke alarm failures each year is missing or flat batteries. In 2003 they accounted for 63% of failures in battery powered alarms. The main reason for failure of mains powered alarms was that the fire products did not reach the detectors (43% of cases)".

The message is still all too clear: it's vital to select, properly install and adequately maintain the best, most reliable smoke alarms possible - and to have both adequate back-up and measures for preventing tampering with alarms.

# BATTERY POWERED ALARMS

The high failure rate of alarms with replaceable batteries is truly frightening. Landlords relying on battery powered alarms to protect tenants cannot be there all the time to check that batteries are present and working – but responsibility still lies with them.

Essentially, the time when a smoke alarm with a replaceable battery was considered adequate has long passed. BS 5839: Pt.6 itself recognises that, while they save lives, they are all too vulnerable to tampering to offer landlords much of a defence under 'duty of care'. It is no surprise to learn that, when one Council made an inspection of its properties fitted with battery units, it found that in excess of 50% of them were 'defective' in some way, due mainly to neglect or from removal of the batteries.

## COVERAGE

Inadequately or improperly installed fire alarms can have a significant bearing on their performance, as borne out by the Fire Statistics.

A badly installed alarm may have its reaction time cut in half - offering occupants as little as 90 seconds or two minutes to get out. By this time, routes of escape may have become impassable, forcing people to jump from high windows. Or flames may have reached them.

An incorrectly installed fire alarm may again leave landlords in both the private and public sector vulnerable to compensation claims from injured tenants or from families of victims.

After one such fire tragedy in which a tenant died, one local authority found that the compensation it had to pay out, plus the cost of litigation, far exceeded the cost of installing quality fire alarms in every single council property in their area. To a private landlord without the resources of a local authority, such a compensation pay out could have been completely ruinous.

The message of BS 5839: Pt.6 is therefore to not only install an adequate number of smoke alarms, but to ensure that they are installed and maintained correctly in every respect.

## THE ESSENTIAL CHANGES TO BS 5839: Pt.6: 2004 – AT A GLANCE

### THE DOCUMENT ITSELF

Each clause of the document is now split into 2 parts. Firstly, there is the commentary – in italics – this sets out the reasoning behind what at first sight may appear to be arbitrary recommendations. The recommendations are in normal type, so it is quite possible to simply refer to these alone. The intention is to make the document easier to use; whether it succeeds in this aim is a matter of personal perception.

### NEW BUILD PROPERTIES

There are now extended recommendations with regard to new build properties.  Essentially these are:
* All properties must have mains powered alarms with a back-up supply – Grade D system
* Smoke alarms should be positioned in escape routes

* Heat alarms should be fitted in the kitchen and possibly the principal habitable room. The definition of a principal habitable room is 'habitable room that is normally the most frequently used room for daytime living purposes'. This would normally be the living or dining room

### CHANGES TO GRADES

There is essentially no change to Grade F, although a five year minimum battery life is recommended in tenanted properties, along with a recommendation that the battery can only be removable by the use of a special tool. A slot headed screwdriver is not considered as meeting this requirement as many articles can be used as an alternative.

Grade C systems now require a central control, rather than a level of control as previously. This implies that some form of panel is required and security systems are put forward as a possible means of meeting this requirement.

Grades D, E and F now include heat alarms.

### FIRE RISK ASSESSMENT

Fire Risk Assessment receives brief coverage at the start, with much greater emphasis given to the subject in Annex A at the back of the document.

It is worth noting the Commentary of Section 4.1: "It is considered that the level of fire risk in dwellings covered by this part of BS 5839 is unlikely ever to be sufficiently low to obviate the need for some form of fire detection and fire alarm system".

### LEVEL OF COVERAGE

LD1, LD2 and LD3 remain unchanged.

However, the terminology has changed. The Code now refers to 'Category' of system instead of 'Type' of system.

## OTHER ALARM TYPES

For the first time, BS 5839: Pt.6 now covers CO fire alarms and multi-sensor alarms.

Heat alarms are given far more importance, as you will have noted from the New Build changes above, for example. Heat Alarms should always comply with BS 5446: Pt.2.

## FALSE ALARM CONTROL

A detailed commentary is given on false alarm control, which should be studied as this is probably the major reason that smoke alarms are disabled by the user. Among its recommendations are:

- Not using ionisation type alarms in escape routes
- The use of heat alarms where nuisance alarms could be a problem – only in areas other than escape routes
- A high level of maintenance to reduce the incidence of false alarms
- No automatic connection to the Fire Brigade, because of the high level of false alarms generated in the home

## ALARMS FOR THE DEAF AND HARD OF HEARING

BS 5839: Pt.6 now has specific recommendations to make on the use of specialist alarms for the deaf or hearing impaired. Strobes and vibrating pads are discussed, as are signalling requirements in daytime rooms. Specific reference is made to the BS 5446: Pt.3 standard.

## SYSTEM VARIATIONS

Where a modification to a system is made, the standard now refers to it as a 'Variation' rather than a 'Deviation', as the latter term implied that the system was in some way inferior. Note that, in cases where a variation from the recommendations is proposed, the system certificate has to be signed and agreed by all parties.

## RF INTERCONNECTION – WIRELESS SYSTEMS

Although the previous version of the document didn't preclude the use of RF as a form of interconnecting smoke alarms, it called for a single final circuit. This potential confusion has been resolved.

Now, because of the introduction of new 'wireless' or 'radio' interconnect systems, Clause 15.5 paragraph b says: "If smoke alarms and heat alarms are of a type that can be interconnected by wiring, all smoke and heat alarms should be connected on a single final circuit". This is clearly intended for hard wired systems, as a note added to this recommendation states: 'This recommendation does not apply if the form of interconnection is not capable of conducting current, e.g. if the means of interconnection comprises radio communication rather than wiring.'
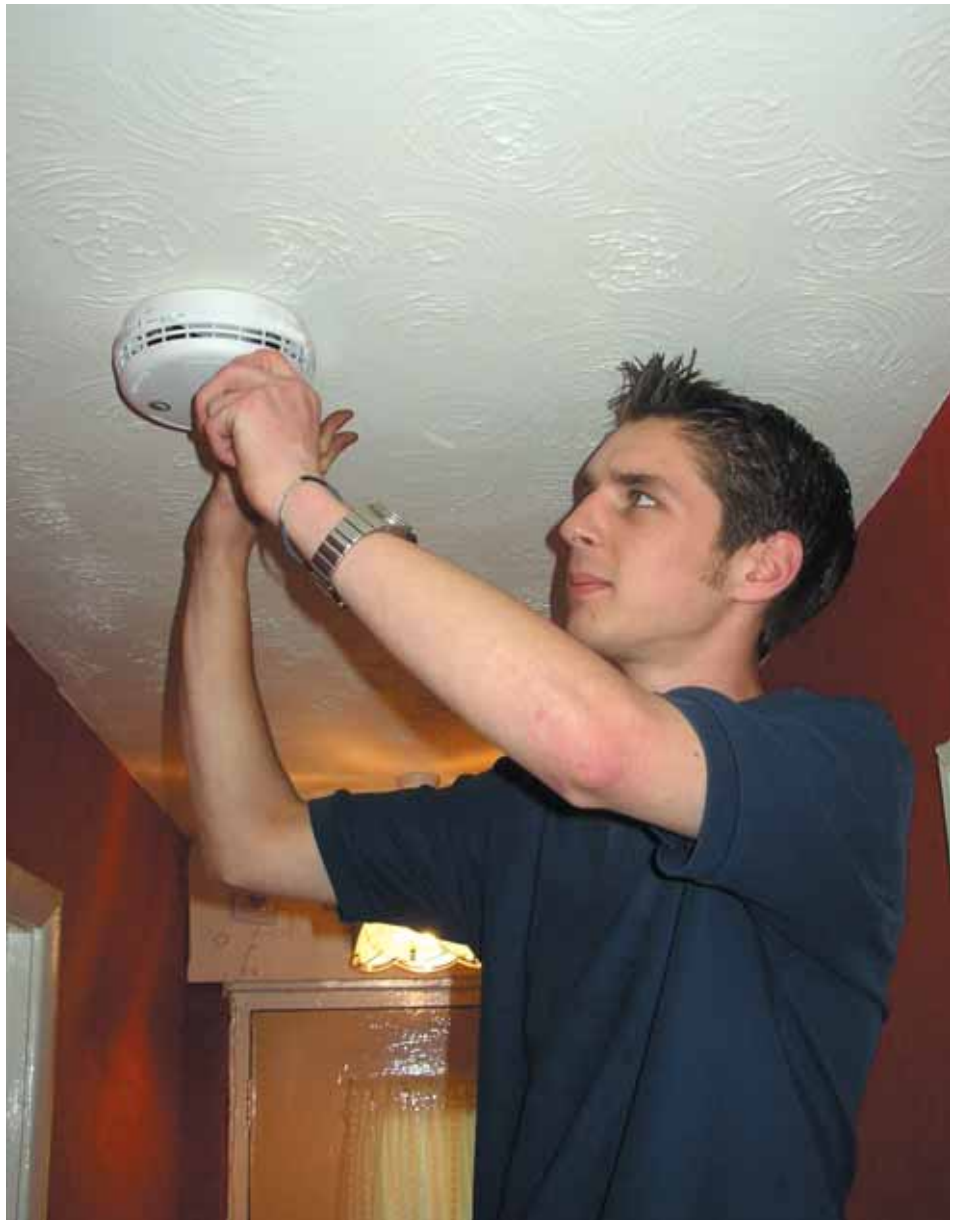
## BS 5839: Pt.6 - AN INTRODUCTION

BS 5839: Pt.6 is not intended for householders themselves, but to provide guidance and recommendations for architects and other building professionals, enforcing authorities, contractors and others responsible for implementing fire precautions in buildings.



The Code of Practice should not be quoted as if it was a specification and the standard itself warns that particular care should be taken to ensure that claims of compliance are not misleading.

It is also pointed out that compliance with a British Standard cannot automatically confer legal immunity. However, for a landlord or installer, compliance with the latest Code is obviously the best line of defence in any claim made against them.

## THE SCOPE OF BS 5839: Pt.6



This Code of practice covers every type of fire detection 'system', from a simple self-contained battery smoke alarm right through to major hard wired 24V systems.

The new 2004 Code further takes into consideration "changes in technology, custom and practice, and changes in guidance that supports national building regulations" since 1995.

BS 5839: Pt.6 also covers almost every conceivable type of premises, including:

- Bungalows
- Multi-storey houses
- Individual flats
- Individual maisonettes
- Mobile homes
- Individual sheltered accommodation
- Houses in multiple occupation (HMOs)
- NHS housing in the community

Both new and existing dwellings are covered.

Communal parts of flats, maisonettes, sheltered accommodation and hostels are not included; neither are caravans.

BS 5839: Pt.6 is primarily concerned with saving lives and reducing injuries. However, it does contain within it recommendations for helping to reduce property damage too. The 2002/3 British Crime Survey, issued by the Office of the Deputy Prime Minister, notes that the mean cost of financial damage caused by a domestic fire is now estimated to be £980 – up a very significant £230 from the £750 estimated in 2001/2. Gross losses to domestic fires have increased by 24% in just one year. This has clear financial implications for the landlord. Good fire safety practice and adherence to the Code can give the best possible early warning of fire and so reduce the financial impact as well as human suffering.

## SYSTEMS

BS 5839: Pt.6 defines a fire detection and alarm system as "a system that comprises a means for automatically detecting one of the characteristic phenomena of fire and a means for providing a warning to occupants". This means that it could simply comprise one smoke alarm or, at the other extreme, a full commercial panel system.

Firstly, it is worth quoting the recommendations in Clause 4.2 of the Code:
"A fire detection and fire alarm system complying with this part of BS 5839, should be installed in all dwellings.. whether new or existing".
"Final design.. should, where reasonably practicable, be based on a form of fire risk assessment.."

The effectiveness of a system is now based upon the probability of system operation (incorporating reliability, monitoring and maintenance issues) and the 'success rate' of the system (the number of alarms, their location, audibility issues and the lifestyle of occupants).

# SYSTEM DESIGN - FIRE RISK ASSESSMENT

How can a system be designed to meet the latest standards?

The Code recommends that a system is designed – where reasonably practicable - based on a fire risk assessment of the property.

This needs to take into account:

- The probability of fire
- Ignition sources
- Possible fire prevention methods
- The lifestyle of the occupants
- The probability and extent of harm
- Means of escape
- Number of storeys in the dwelling
- Flammable materials (e.g. smoking)
- The age, physical condition and socio-economic nature of the occupant

Fire risk then is essentially a combination of the probability of fire occurring and the magnitude of the consequences of fire.

In this way, the Code is recognising that you don't have to buy the most expensive fire detection system available. You must, however, ensure that the system is adequate for the risks involved.

A high fire risk demands high reliability to ensure early detection of fire and warning to occupants, regardless of where the fire starts, and high reliability on the part of the system to operate correctly when required.

On the other hand, a low fire risk may not justify the cost, complexity and extent of such a system.

For example, the single occupant of a small bungalow might be adequately protected by the installation of one mains powered smoke alarm, whereas the risk to which families in a six storey house in multiple occupation are exposed would warrant much greater expenditure on a more complex and comprehensive system.

This sort of common sense approach permeates the Code and this, coupled with its acknowledgement of economic constraints, makes the Code particularly simple to adhere to.

The design of the system - which includes considerations such as the number of and siting of alarms, and the form of power supply required should take the following factors into account:

1. The probability of fire occurring
2. The probability of injury or death of occupants if fire occurs
3. The probability of the system operating correctly at the time of a fire
4. The probability of early detection and warning to occupants in the event of fire

Points one and two combined define the 'fire risk', while point three relates to system reliability. The fourth point is defined by the standard as 'a form of success rate for the system'.

The Code recommends that fire risk be assessed by taking into account a number of different factors. These are now to be found in Annex A of the 2004 Code.
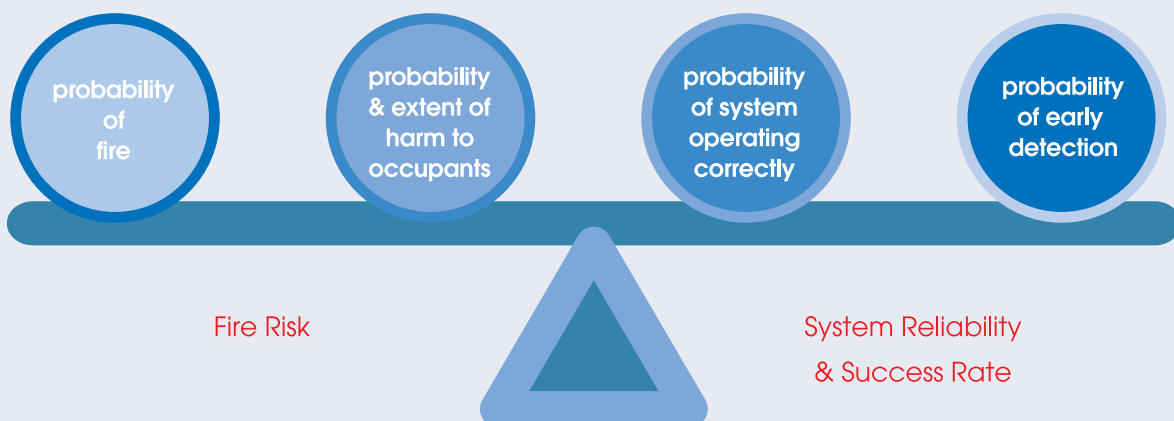
Firstly, it recommends that each room in a dwelling be assessed for its own particular fire risk, taking into account current statistical information. How likely is it that a fire will start in a living room, for example? Or a bedroom? What are the possible sources of ignition in that room? Statistically, what are the chances of injury or death to an occupant if a fire does break out in that type of room?

## ASSESSING FIRE RISK

The Code discusses the generally relevant factors in carrying out a fire risk assessment to determine the most appropriate design of fire detection and fire alarm system. However, it also notes that the lifestyle of the occupants may require a change to the assessment.

The Code looks at where fatal fires typically break out and where occupants may be at the time.

First and foremost, it notes that the greatest impediment to escape in the event of a fire is smoke obscuring the escape route. Any fire which starts in a circulation area - or spreads to a circulation area - needs to be detected as soon as possible. The Code says that "smoke detectors need to be installed in the circulation areas of all dwellings".



probability of fire    probability & extent of harm to occupants    probability of system operating correctly    probability of early detection

Fire Risk      System Reliability & Success Rate

BALANCE BETWEEN FIRE RISK & SYSTEM RELIABILITY & SUCCESS RATE

## FIRE RISK - WHERE DO FIRES START?

Just over half of all fatalities occur in the room where the fire breaks out; in HMOs, this rises to 60%. The Code notes that, in the United Kingdom, some 40% of all fatal fires start in living rooms or dining rooms, whereas 30% of fatal fires start in bedrooms. For this reason, the Code recommends that if alarms are to be installed within rooms, the living room and the dining room should be the first priority. However, this consideration could be reversed if the bedroom presents a particular fire risk, such as the occupant smoking in bed or using an electric blanket.

The Code also specifically warns that occupants – especially those asleep and/or with a closed door between them and the alarm - may not hear the alarm in time. It stresses that it is 'therefore essential that fire detection and fire alarm systems are capable of operating correctly when occupants are asleep and are capable of rousing occupants from normal sleep.' This is another reason why - if there is a significant fire risk in a particular room - consideration should be given to installing alarms in that room - and interlinking the entire system.

After kitchen fires and electrical appliances and wiring, smoking continues to be the next most common cause of accidental fires in the home. However, it is the number one cause of fire deaths. Around 40% of all fire deaths are caused through matches or a discarded cigarette (the figure was

33% in1995 when the Code was first published). In most cases, the item ignited is bedding or furniture. If occupants are known to smoke, there is a greater need to install smoke alarms in the living room or dining room areas. If the occupants smoke in bed, the Code suggests considering installing smoke alarms in the bedroom itself. Ominously, statistics reveal that - if such a fire begins in a room where an occupant is asleep - their chances of survival are greatly reduced. By the time an alarm sounds in an adjacent area, it may very well already be too late.



Fires caused by space heating appliances are also particularly life threatening. After fires caused by smoking and cooking appliances, these types of fires account for more deaths than any other cause - around 12% of accidental fire deaths. These fires often occur when something inflammable is placed too close to the heater. The Code suggests that, if portable heaters or solid fuel fires are used at night, there may be good justification for installing smoke alarms in the relevant rooms - particularly bedrooms.

Fires caused by electrical appliances account for some 10% of all household fires, but result in only 6% of deaths. Electric



blankets and bed warmers cause 40% of all the deaths in fires due to faulty electrical appliances. The Code says that 'use of electric blankets, particularly by high risk groups such as the elderly, increases the justification for providing smoke alarms in bedrooms'. As with smoking materials, by the time an alarm in an adjacent area detects smoke, it may be too late.

Finally, the new 2004 Code acknowledges that there is a very worrying increase in the incidence of arson, just as it did back in 1995. Malicious ignition is the second most common source of ignition in all fires in dwellings. Arson is particularly worrying in multiple occupancy dwellings and the Code stresses that the level of fire protection in such places needs to be very high if there is a significant risk of malicious fire-raising. It even goes so far as to suggest installing alarms near the door in case inflammable materials are pushed through the letterbox.

## WHO IS MOST AT RISK?

The occupants of a property are another significant factor which needs to be considered.

The Code acknowledges that elderly people are at 'significantly greater risk' from fire than other age groups. For those over 80, the probability of dying in a fire is several times that for those aged from 30 to 59. Those aged between 60 and 80 are also at increased risk. Children under five are at greater risk than adults.

For that reason, the Code recommends greater levels of fire protection in dwellings occupied by the elderly or those with young children.

### MOST COMMON CAUSES OF ACCIDENTAL FIRES



Other 10%  Electrical appliances 10%
Cooking appliances 40%
Smokers materials 40%
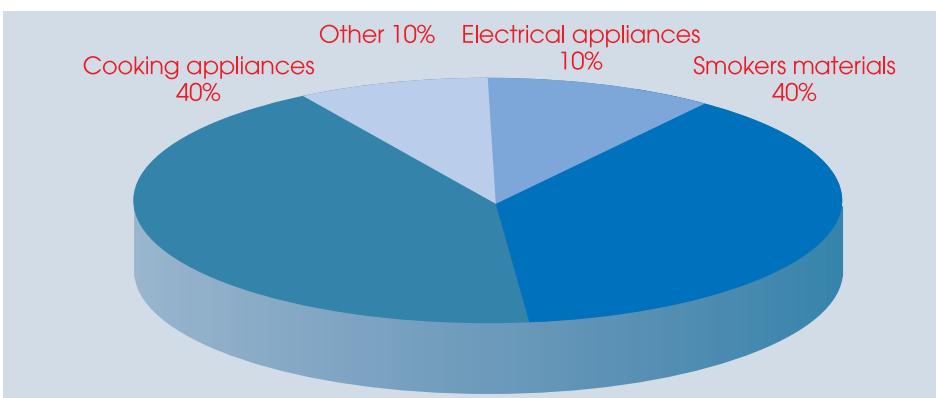
Interestingly, the Code acknowledges that people on a low income are more at risk than other groups, which is borne out by statistics from the British Crime Survey. They may not be able to afford to replace batteries in smoke alarms and the Code consequently points out that 'a more reliable power supply for the fire detection and alarm system is essential'. This worry, coupled with the fear of alarms being cut off to poorer residents along with their electricity supply, permeates the entire document and needs to be stressed.

People living in a house in multiple occupation are between eight and ten times more likely to die in a fire than those in single family homes, it has been estimated. However, the Code distinguishes between properties commonly designated as HMOs. On the one hand, a family living with a lodger might not be classed as an HMO as the fire risk may be no greater than a normal dwelling. It identifies the greatest risk in houses converted into bedsits and to elderly people in sheltered accommodation. Generally, the risk is also greater if the property exceeds two storeys in height. Here the Code recommends "where the risk in an HMO is relatively high, it is essential that there is protection by a highly reliable fire detection and fire alarm system. It is also essential that a warning is given in the event of a fault that impairs the standard of protection".

People with impaired mobility require more time to escape. They need the earliest possible warning of a fire and greater alarm coverage. The hearing impaired also have very particular needs, and these are dealt with later in this document.

It is obvious to any landlord - in the public or private sector - that those judged to be most at risk and in need of a high level of protection are those who form a typical cross section of their tenants.

## PROPERTY PROTECTION

BS 5839: Pt.6 also adds other considerations for the protection of property. However, it stresses that only in exceptional circumstances, for example in a house of historical importance where no-one sleeps, should the principle objective of a fire detection system ever be the preservation of property rather than lives.

If property damage is the decisive factor, the Code recommends installing a system which results in the fire brigade being called early enough to limit property damage.

As a fire that starts anywhere will cause damage, consideration should be given to providing detectors in some or all rooms of the building. Coverage in circulation areas alone is unlikely to be adequate. Once again, areas with a statistically greater fire risk, such as kitchens and boiler rooms, where likely sources of ignition are present, should have priority for detectors.

Property damage should, of course, never be a deciding factor for a landlord, but it is worth bearing in mind not only the human cost but also the financial cost of a fire breaking out in a property. Insurance premiums may rise, renovation costs may be expensive and revenue from the property will be lost while it is being made habitable, to say nothing of the cost of re-housing tenants. Once again, the cost-effectiveness of a quality fire alarm system offering the earliest possible warning is self-evident.

## TYPES OF ALARM TECHNOLOGY

The next issue raised by the Code is the types of alarm available.

## BATTERY OPERATED SMOKE ALARMS - GRADE F



BS 5839: Pt.6 acknowledges the advantages of the single, battery operated smoke alarm. They're simple to install and offer protection at very low cost. Battery operated smoke alarms conforming to BS 5446: Pt.1 are recommended. However, these alarms do have serious drawbacks. Occupants on a tight budget may not be able to afford to replace the batteries. A significant number of tenants have also been shown to remove the batteries to prevent false alarms or to use in other battery powered devices and then forget to replace them. For this reason, the Code recommends that these alarms should not be used to protect tenants in properties of more than one storey – and even then the batteries should be sealed-in and have a life in excess of 5 years.

As an aside, landlords have now been found liable in cases where tenants themselves have disabled an alarm. For this reason, it is unlikely that landlords will be able to trust tenants to adequately look after the alarms. The Code highlights the fact that battery powered alarms are only suitable for owner-occupied properties if the likelihood is that batteries will be replaced within five days of a low battery signal.

## MAINS POWERED SMOKE ALARMS - GRADE E

The Code states that mains powered smoke alarms are potentially more reliable and are recommended to be installed in existing dwellings occupied by people who are unlikely to be able to change a smoke alarm's battery.

However, mains powered systems have their drawbacks; power cuts or the termination of supply for whatever reason disables them totally. They can also be rendered useless by the tripping of a protective device, or even - in some cases - by the fire itself. Householders may also disable them at the mains all too easily if false alarms are a problem.

## MAINS POWERED SMOKE ALARMS WITH STAND-BY SUPPLY - GRADE D

The problems outlined above can be overcome by using alarms that incorporate, within each alarm, a stand-by supply such as a primary or rechargeable battery.

This sort of system should be considered, says the Code, if the reliability of the mains supply is not high, or if the fire risk is likely to be high during periods of failure or disconnection of the mains supply to the dwelling. In new build and tenanted two storey properties this type of alarm is now considered essential.

This begs a simple question of landlords - can they be sure that their tenants are paying their

electricity bills? Given that many tenants may have low incomes (in many local authorities, 70% or more of all tenants are on subsidised incomes), they may well experience periods of disconnection - and yet the landlord could well be liable if the alarm fails to sound because the tenant has not paid his or her bills! Unfair or not, as the law stands, it obviously makes good commercial sense to ensure that a reliable, high quality back-up battery facility is in place.

The minimum back-up duration recommended is 72 hours, and the Code acknowledges that there could well be circumstances where a longer stand-by period is justified e.g. tenants' inability to pay their electricity bill.

## FIRE DETECTORS SUPPLIED WITH POWER FROM A COMMON POWER SUPPLY UNIT

Beyond this, more expensive high specification systems can offer connection of all fire detection devices to a common power supply via low voltage transformers, or interlinked fire and security systems.

Again, a minimum 72 hour back-up is recommended by the Code.

## OTHER SYSTEMS

For larger applications, such as mansions and HMOs, or for areas with a high risk of fire, higher grade systems are recommended.

## SYSTEM PLANNING

BS 5839: Pt.6 quite reasonably points out that, no matter how good the system is, people will only have an adequate chance of escape if there are enough detectors installed and if the alarms can successfully rouse them from sleep.

## SILENCING & DISABLEMENT

The Code is very aware of the grave danger posed by tampering with alarms and their wilful disablement. It acknowledges that false alarms are a major reason why householders disable alarms, and looks at practical steps to help prevent this. Foremost among these recommendations is a built-in method by which alarms can be silenced without the use of a tool of any kind, for example a "Hush" or False Alarm Control button.

The Code stresses the role of specifying "good quality equipment" in reducing false alarms, and makes helpful distinctions between alarm sensor types in reducing sensitivity to environmental factors liable to cause false alarms, such as cooking vapours.

However, the need to avoid false alarms should never take priority over the need for early fire detection.

The 2004 Code says that the high rate of false alarms in dwellings makes it 'generally inappropriate' to connect domestic smoke alarms direct to a fire and rescue service. However, it acknowledges that vulnerable people such as the disabled might benefit from such a connection.

## QUALITY & COMPATIBILITY

The quality of equipment installed is a factor that needs to be carefully considered. The Code states that, in general, all components should conform to relevant British Standards and should have undergone type testing to those Standards. Suppliers should preferably have approval to a recognised quality approval scheme such as the relevant BS EN ISO 9000 series standard. If no British Standards apply, reasonable care should be taken that components are fit for the purpose intended.

The Code recommends that all individual system components should be mutually compatible.

Conformance to the relevant British Standard is no guarantee that the components of a system will be compatible. Consequently, this should be confirmed at the design stage.

## THE GRADE SYSTEM

Relates to system engineering not level of protection.

BS 5839: Pt.6 grades fire detection systems from Grade A down to Grade F. Generally speaking, the greater the fire risk and the more demanding the application, the more comprehensive the system needs to be.

- **Grade A** - Fire detection system incorporating control and indicating equipment to BS EN 54-2, and power supply to BS EN 54-4, installed to BS 5839: Pt.1 with some minor exceptions
- **Grade B** - Fire detection and alarm system comprising fire detectors (other than smoke alarms), fire alarm sounders and control and indicating equipment to either BS EN 54-2 (and power supply to BS EN 54-4), or to Annex C of BS 5839: Pt.6
- **Grade C** - System consisting of smoke detectors and sounders (which may be smoke alarms) connected to a common power supply, comprising normal mains and stand-by supply, with central control equipment
- **Grade D** - System incorporating one or more mains powered smoke alarms (and heat alarms if required) each with an integral stand-by supply
- **Grade E** - System of mains powered smoke alarms (and heat alarms if required) with no stand-by supply
- **Grade F** - System of one or more battery powered smoke alarms (and heat alarms if required)

The changes from the previous edition are relatively small: Grade A & B now refer to the latest European Standards and there are minor changes in requirements. Grade C now requires central control of the system. Grades E, D & F now have reference to heat alarms in addition to smoke alarms.

Concerned by problems with battery powered units in Grade F, the prescriptive advice in the Code now recommends a minimum five year battery life and batteries that are secured so that a special tool is required to remove them for use in tenanted single storey properties.

As the overwhelming number of residential applications in the UK will fall into the D to F categories, this is the area on which this guide will naturally focus. If you are particularly interested in unusual grades of protection, you are invited to look further at the relevant clauses of the Code.

Of course, installers and specifiers may install a system with greater safety features than laid down in the letter of the Code. For example, rather than a Grade E system landlords might think it prudent to install a Grade D system instead. This is especially true considering the many restrictions that apply to the use of Grade E systems.

## LEVELS OF PROTECTION

## CATEGORIES OF SYSTEM

This was previously referred to as 'type' of system. It relates to the level of protection afforded by the system.

Within the A - F grades defined earlier, the Code identifies three different categories of protection:

- **LD1** - A system installed throughout the dwelling, incorporating detectors in all circulation spaces that form part of the escape routes from the dwelling, and in all rooms and areas in which fire might start, other than toilets, bathrooms and shower rooms

- **LD2** - A system incorporating detectors in all circulation spaces that form part of the escape routes from the dwelling, and in all rooms or areas that present a high risk of fire

- **LD3** - A system incorporating detectors in all circulation spaces that form part of the escape routes from the dwelling

Apart from the change of name, there are no changes to the 'Categories' from the previous version of the code.

It is noted that an LD3 type system is intended to protect escape routes for those not directly involved in the fire and may not save the life of anyone in the immediate vicinity of the fire.

The Code also features two grades of protection for property - PD1 and PD2. Briefly, PD1 offers comprehensive coverage of all areas, while a PD2 system includes detectors in only those areas where there has been judged a fire risk. Only by quoting Grade and Category can a meaningful and effective alarm system be specified, e.g. Grade D, Category LD2.

## SELECTING THE RIGHT SYSTEM

How do you choose which grade of system to install? The Code states that the grade of system that should be installed depends "on the nature of the dwelling, the level of the fire risk and the characteristics of the occupants."



It points out that Grade F systems (battery alarms) are the least reliable and the system used in new dwellings should be Grade D (mains powered with integral back-up supply) or higher. Existing owner occupied dwellings can be covered by a Grade F system provided:

• The fire risk is not high
• There is a reasonable certainty that batteries will be replaced within a short time, that is, no more than five days after a low battery signal

If these criteria cannot be met, a Grade E or higher system should be installed. Existing tenanted dwellings of two or more storeys should have Grade D systems installed.

From a landlord's point of view, the case for a Grade D system (mains with stand-by) seems to be quite obvious. Can they be 'reasonably certain' that a tenant will replace smoke alarm batteries within five days? Do they have 'absolutely no worries about their tenants paying their electricity bills'? The Code is asking for that level of assurance.

Once you have decided what Grade of system to use, you then need to ask yourself just how comprehensive the system needs to be, and this is what governs the LD 'Category' system.

All dwellings should be covered to at least an LD3 standard, with the decision being based primarily on fire risk.

If there is a high risk to occupants from fire in any part of the building, Category LD1 or LD2 protection level should be considered. Those who are infirm or elderly might particularly benefit from a higher level of coverage. If people are likely to be in a room where a fire may break out, this level of coverage is also recommended.

The Code acknowledges that in situations where a large number of properties are involved i.e. the housing stock of a Local Authority, it is perhaps not practical to undertake a Fire Risk Assessment on every one of these properties. To take account of this a table listing the 'Minimum Grade and Category of fire detection and fire alarm system for protection of life in typical dwellings' – often referred to as 'Prescriptive Advice' - is provided. At first sight this appears to be an easy method of deciding on the appropriate system to use in any specific property type. However, care should be exercised in applying these recommendations as in many cases there are notes qualifying them; this is particularly relevant to those given for existing properties. If the notes are overlooked, there is a risk of applying an incorrect assessment to the property and as a result specifying what may be interpreted as an inadequate system. In view of this, it may be worth considering applying the 'New Build' recommendations to existing properties to minimise this risk.

## PRESCRIPTIVE ADVICE SUMMARY

### New Build
**Up to 3 storey - owner occupied or rented**
Grade D, Category LD2
Smoke alarms should be installed in circulation spaces, heat alarms in kitchen and principal living room (smoke alarms are an acceptable alternative in the living room).
**Over 3 storey - owner occupied or rented**
Grade B, Category LD2
Smoke detectors should be installed in circulation spaces, heat detectors in kitchen and principal living room (smoke detectors are an acceptable alternative in the living room).

### Existing Properties
**Single storey - owner occupied**
Grade F, Category LD3
Grade E should be installed if there is doubt regarding the ability of the occupier to replace batteries, or Grade D if the reliability of the mains power supply is suspect.
**Single storey - rented**
Grade F, Category LD3
The battery should have an expected life in excess of 5 years and should only be accessible by means of a special tool. Grade E should be installed if there is doubt regarding the ability of the occupier to replace batteries, or Grade D if the reliability of the mains power supply is suspect.
**2 or 3 storey house or maisonette - owner occupied**
Grade F, Category LD3
Grade E should be installed if there is doubt regarding the ability of the occupier to replace batteries, or Grade D if the reliability of the mains power supply is also suspect.
**2 or 3 storey house or maisonette - rented** Grade D, Category LD3
Category LD2 if a risk assessment justifies additional alarms.

### Houses in Multiple Occupation
**Up to 2 storey - New Build**
Grade D, Category LD2
Smoke alarms should be installed in circulation spaces, heat alarms in kitchen and principal living room (smoke alarms are an acceptable alternative in the living room).
**Up to 2 storey - Existing property**
Grade D, Category LD3
Category LD2 if a risk assessment justifies additional alarms.
**All other types**
Grade D, Category LD3 in individual dwelllings. Grade A, Category LD2 in communal areas.

Where fire precautions are subject to legislative control, the enforcing authority should be consulted before a decision on the appropriate Grade and Category of system is reached.

# CHOOSING WHICH ALARMS TO USE

BS 5839: Pt.6 also looks in depth at the different kind of fire alarm sensors on offer. Sensibly, it points out that there is no single type of alarm that is most suitable in all cases and the final choice of which type of alarm to use will depend on individual circumstances.

In general, these circumstances are the desire to afford the earliest possible warning of a fire and the need to minimise false alarms.

This means, in plain English, that the most suitable alarm should always be installed - and not just the cheapest option. This is a point that landlords cannot overlook in meeting their 'duty of care' obligations.

The Code recommends that optical smoke alarms should be installed in circulation spaces, such as hallways and near kitchens. They should also be considered in areas where a likely cause of fire is ignition of furniture or bedding by a cigarette.

Ionisation alarms are recommended more for use in living rooms or dining rooms, where a fast burning fire may present a greater danger than a slow smouldering one, though due consideration needs to be given to the potential for false alarms. The new 2004 Code does not recommend the use of ionisation types in escape routes.
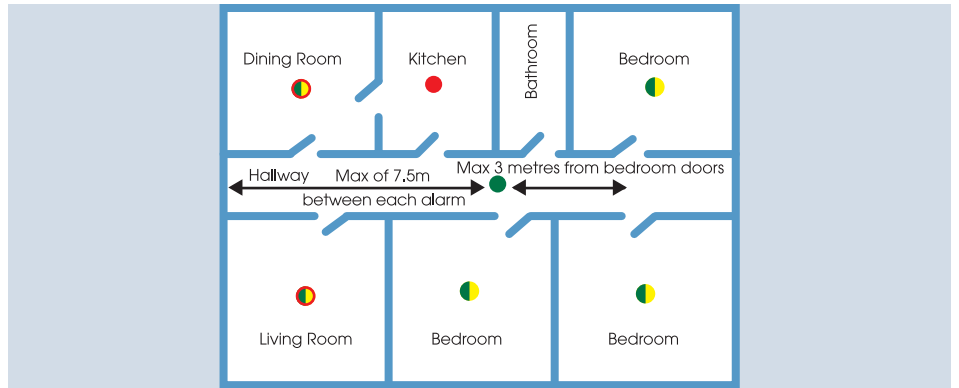




SINGLE STOREY DWELLING

- Optical or Ionisation smoke alarm as best suited for the particular circumstances
- Optical smoke alarm
- Smoke or heat alarm as best suited for the particular circumstances
- Heat alarm

Do not install smoke or heat alarms in bathrooms, shower rooms or toilets

The Code also looks at a third type of alarm - heat. More emphasis is placed upon the use of heat alarms than previously. The Code recommends that they should comply with BS 5446: Pt.2 and suggests they be used where nuisance alarms from other sensor types are a concern. In new build properties heat alarms are now recommended both in the kitchen and possibly the principal habitable room, such as the living room.

Domestic heat alarms require less maintenance than any other type of unit and aren't prone to false alarms caused by contamination or smoke caused by cooking. For this reason, heat alarms were originally specifically designed for use in kitchens or garages, where other alarms are less reliable and more likely to go off accidentally. Fire deaths from fires originating in the kitchen are sadly increasing and such fires can often cause extensive property damage and, therefore, landlords might consider them good insurance. Heat alarms are generally less sensitive than smoke alarms and must not be used in circulation areas.

BS 5839: Pt.6 recommends that heat alarms have a role to play in Category LD2 systems.

The Code acknowledges that a mix and match approach to systems is sensible, installing different detector types in areas where they are most effective.

For more information on the different types of detection technology available, please see the product information section towards the back of this guide.

CO and Multi-sensor fire alarms are introduced into the 2004 Code. CO fire alarms are specifically designed for detecting carbon monoxide produced in a fire and can respond quicker than heat detectors, but are almost always slower to respond than a smoke alarm. The type used for detecting CO gas from faulty appliances etc are designed to respond at much higher levels of CO. Consequently, CO alarms conforming to BS 7860 or BS EN 50291 should not be used as CO fire alarms. It is not likely that CO fire alarms have a significant role to play in domestic dwellings at present.

A Multi-sensor alarm is defined in the standard as a "fire detector that monitors more than one physical and/or chemical phenomenon associated with fire". An alarm consisting of an optical sensor and a heat sensor, or one containing an ionisation sensor and a CO sensor, would fit this definition. The benefit of this type of detector is that a broader response to different fire types can be achieved with, often, a reduction in false alarm problems. At present there are no suitable types available for use with smoke alarm systems.
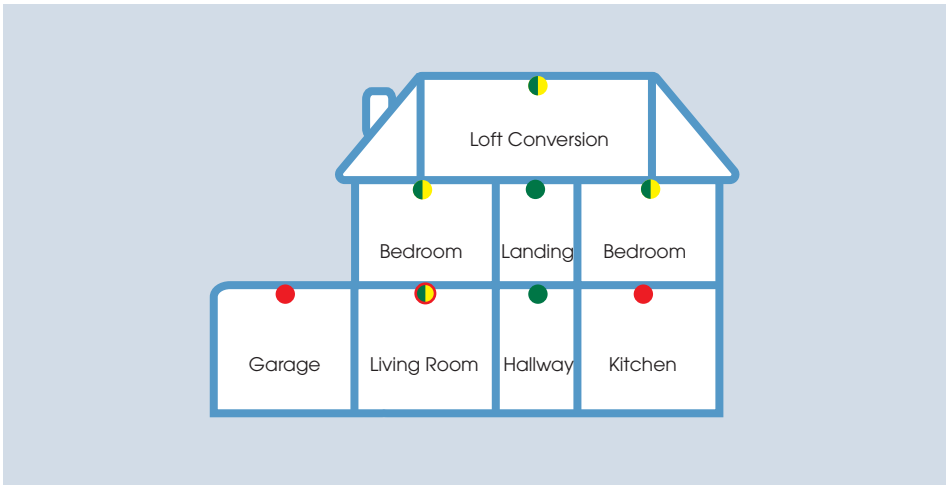
**AVERAGE TWO STOREY HOUSE**

- 🟡 Optical or ionisation smoke alarm as best suited for the particular circumstances
- 🟢 Optical smoke alarm
- 🔴 Smoke or heat alarm as best suited for the particular circumstances
- 🔴 Heat alarm

Do not install smoke or heat alarms in bathrooms, shower rooms or toilets

## SITING OF SMOKE ALARMS



Siting alarm on a sloping ceiling

Siting alarm in a room

Siting alarms in hallways and landings

✓ Correct ceiling siting position for alarms

✗ Do not install alarms here

How you position smoke alarms can be as important as choosing the right type of alarm to use.

As a minimum, a typical bungalow would need at least one alarm, a two storey dwelling two alarms and so forth.

In all Category LD systems, at least one smoke alarm should be located between the sleeping areas and the most likely source of fire - the living room and kitchen.

In a single storey dwelling with one alarm, the alarm should be placed as close as possible to the living accommodation, but consideration must be given to audibility in the bedroom. To achieve audibility of 85dB(A) at the bedroom doorway, alarms should be sited within 3m of bedroom doors.

In a multi-storey house, at least one smoke alarm should be located on the ground floor between the staircase and any room in which a fire is liable to start. A smoke alarm should also be installed on each main landing. In LD2 and LD1 systems, additional alarms need to be provided.

## Positioning of Smoke Alarms:

There are a number of factors one has to take into consideration when positioning and maintaining a smoke alarm. The design and occupation of the premises will obviously be one of the influencing factors in deciding where to position the units as well as the likely types of fire and also the maintenance required. There are, however, some general guidelines that apply to all smoke alarms.

## Ceiling Mounting:

Hot smoke rises and spreads out so a central ceiling position is the preferred location. The air in corners is "dead" and does not move, therefore smoke alarms must be mounted away from corners and walls. Place the alarm at least 300mm from any light fitting or decorative object that might obstruct smoke entering the smoke alarm.

## On a Sloping Ceiling:

In areas with sloping or peaked ceilings install the smoke alarm 900mm from the highest point measured horizontally, because "dead" air at the apex may prevent smoke reaching the unit.

## Positioning Heat Alarms:

A heat alarm must be placed on the ceiling, preferably in the centre, or close to the likely source of fire. Air within the corners is dead and so heat alarms should be placed away from any corners. The alarms should be placed at least 300mm from any light fitting or decorative object that might obstruct the heat travelling to the sensor. Interconnection with smoke alarms is essential.

Spacing recommendations say that, under flat horizontal type ceilings, the horizontal distance from any point in the protected area to the detector nearest to that point should not exceed 5.3 metres for heat detectors and 7.5 metres for smoke detectors.

## AUDIBILITY



Audibility is another factor to be considered. The Code comments that ideally, an alarm system should be capable of producing a sound level of 75dB(A) at the bedhead, but that this is unlikely to be achieved unless there is a sounder/smoke alarm in the bedroom itself. As there is no evidence of life being lost in single family dwellings due to the lower sound level achieved by siting an alarm within 3 metres of the bedroom doors, in many dwellings this would be acceptable. In HMOs, where higher levels of ambient noise is likely, additional alarms/sounders may be necessary.

A practical way to check audibility is with the alarm sounding in its intended location, check that the occupant is able to hear it in each bedroom with the door closed above the sound of a radio set to a reasonably loud conversation level. In this case, interconnected alarms provide an ideal solution, a remote alarm picking up the fire and a sounder being triggered to wake the occupier.

## SPECIAL NEEDS PROVISION

Back in 1995, the original Code acknowledged the special needs of people who are deaf or hearing impaired and recommended the use of alternative fire alarm systems to meet their needs. More attention is paid to the issue in the new 2004 update.

A special alarm can be incorporated into domestic mains fire alarm systems to protect people with impaired hearing. It's a simple, yet ingenious idea.

In the event of a fire being detected, a small vibrating pad located beneath the sleeper's pillow gently alerts them. At the same time a powerful strobe light flashes to provide a further visual warning.

Devices such as these are now increasingly cited as important considerations and should be considered as a matter of course in applications where the residents are likely to be elderly, as in a nursing home for example, or in sheltered accommodation.

The 2004 Code notes that the final system applied should take into account the assessed needs of the person being protected. However, it should always conform to BS 5446: Pt.3 (Grade A and B systems aside, where other standards quoted may be more appropriate).

## INSTALLATION OF GRADE D AND E SYSTEMS

Once these considerations have all been taken into account and the system adequately planned, it can then be installed, tested and commissioned.

Systems should be installed in accordance with BS 7671 (IEE Regulations 16th Edition) by a qualified installer. All alarms should be fitted into place securely and permanently, and attention given to protecting all wiring from impact or rodent damage by recessing or trunking.

If you intend to install the alarms in a new building, however, it is usually necessary to wait until all other work on site has been completed and the building has been fully cleaned before installing any smoke alarms. This is because excess dust and debris from building work can contaminate the alarms and render them prone to false alarms. However, new 'Easi-fit' style alarms are a useful exception, with the wiring able to be completed during 'first fix' and the detector head simply slotted into place when all cleaning work has been completed.

If, for any reason, other types of alarms have to be installed before all work is complete, ensure that they are completely covered, particularly around

the edges, with the dust cover that should be supplied with each alarm. Only when all cleaning is finished should these dust covers be removed.

## POWER SOURCE



The normal supply for Grade D and E systems is the public mains supply. A Grade D system should be connected either to an independent circuit at the dwelling's main distribution board (with no other electrical equipment attached except for a dedicated monitoring device) or a separate, electrically protected, regularly used local lighting circuit. A Grade E system may only use the former option.

Hard wired interconnected smoke alarms should be on one final circuit. However, the 2004 version of the code now accepts that smoke and heat alarms using a radio signal for the interconnect can be separately wired from the nearest lighting circuit with a permanent mains supply.

## RADIO LINKED SYSTEMS

Pages 41-44 of the 2004 Code now set out the criteria for radio-linked systems. It is acknowledged now that Grades D-F systems may use radio interconnection. However, it warns about the potential drawbacks of battery powered units being interconnected in such a way if there is a need to replace the batteries at regular intervals (by implication mains powered radio-linked alarms do not have these drawbacks).

As is typical with the Code, it stresses the need to ensure that such a system meets the needs of the application.

The new publication also goes out of its way to recognise that the old Code

provisions might have previously technically precluded the use of wireless systems and overcomes this by pointing out that issues relating to power supplies, fault monitoring and integrity and performance may not be the same for hard wired and radio linked systems.

Special recommendations are also given to their use in HMOs.

## WIRING OF MAINS POWERED SMOKE AND HEAT ALARMS

When installing, any cable may be used which is suitable for domestic mains wiring, provided it is in accordance with the relevant parts of BS 7671.

- There is no requirement for fire resistant cable and the use of red-sheathed cable is not required when installing Grade D, E and F systems
- 6243Y mains cable is recommended using the third core for the interconnect circuit. The earth wire must not be used for the interconnect circuit. The maximum recommended cable run is 250 metres, with $1mm^2$ or $1.5mm^2$ cable

Amendment No 2 to BS 7671: 2001 allows 'harmonised' cable colours to be used for installations after 31st March 2004 (they must be used for installations commencing after 31st March 2006). The NICEIC recommends that 6243Y cable with the following colours should be used for smoke alarm systems.

| | |
|---|---|
| Live | - Brown |
| Neutral | - Grey (oversleeve blue at terminations) |
| Interconnect | - Black |

Great care should be exercised in ensuring correct identification of the wiring connections as an interconnected smoke/heat alarm system will suffer irreparable damage if the live and neutral connections are reversed, or if a 240V phase conductor is connected to the interconnect terminal.

- Connect to an independent circuit at the distribution board if the alarm does not have a standby supply - Grade E
- RCD Protection is generally not required, but if used it should be dedicated only to the smoke alarm circuit or be independent of circuits supplying sockets or portable equipment
- Smoke alarms should not be installed in new or renovated buildings until all work is completed (including floor coverings) and the building has been fully cleaned, unless using an Easi-fit style alarm. Excessive dust and debris from building work can contaminate the smoke chambers and cause false alarms. It will also invalidate the guarantee. If alarms must be installed before work is finished, either use an 'Easi-fit' alarm or ensure that the alarm is completely covered, particularly around the edges, with the dust cover that is supplied with each of our smoke alarms

Where appropriate, cable penetrations should be fire-stopped. If there is any danger of impact damage, abrasion or rodent attack, appropriate protection should be fitted.

A convenient and reliable alternative to hard wired interconnection is now readily available in the form of RadioLINK from Aico (see page 22).

## CERTIFICATION AND PAPERWORK

The installer should certify that the installation conforms to BS 5839: Pt.6 for the correct Category and Grade of system. If any variations have been agreed to, these should be duly noted. The Code provides a model certificate for installers to complete.

Suppliers of the equipment should provide the occupier of the dwelling with clear and readily understood information on the system and its use. All alarms should come complete with user instructions, designed to be easily understood, covering such topics as

operation, testing, maintenance, false alarms, escape plans and siting.

## TESTING AND MAINTENANCE

Regular routine testing and maintenance is very important and should be considered at the design stage.

The Code states that the user has a responsibility for routinely testing the system and should be supplied with simple instructions on how to do this.

All smoke alarm systems should be tested at least weekly using the integral test button. Remote test and false alarm control switches can be used to avoid the need for the user to reach up to the alarms. Systems should also be checked if the occupier has been away or the power has failed.

In Grade D to F applications, smoke alarms should be cleaned periodically in accordance with manufacturers' recommendations. Where experience shows that excessive levels of dust are compromising the effectiveness of the system, more frequent cleaning and servicing may be required.

## NEGLIGENCE

The exact question of negligence and liability falls outside the scope of the standard. It is up to the courts to judge these issues.

From some considered opinion covering the area of legal liability we quote below extracts from an article written on behalf of the National Housing and Town Planning Council (NHTPC) by Martin Daley, to whom we are grateful for granting us permission to quote from his work.

According to Daley, the NHTPC has been fortunate in having sight of independent research on smoke alarm liability by Dr Anne Everton. The following ten situations, based on Dr Everton's research, should, says Daley, 'be avoided at all costs':

1    Where the smoke alarm is defective in design

2    Where the smoke alarm is defective in manufacture
3    Where the smoke alarm is located where it cannot operate
4    When there are not enough smoke alarms
5    Where the source of power fails
6    Where the source of power for the smoke alarm is removed
7    When the smoke alarm has been incorrectly installed
8    Where the smoke alarm has been damaged during installation
9    Where the smoke alarm has been damaged as a result of malice
10   Where the smoke alarm has been removed from the property

No matter how circumspect the landlord is, however, there is no cast iron guarantee that they can fully protect themselves against all possible liability claims.

However, with regards to fire safety, the most fundamental step they can take now is to install at least a Grade D mains powered system. Failure to do so, for whatever reason, would simply be indefensible if and when a case came to court.

'Duty of care' falls squarely upon the landlord. Dr Ann Everton says that, increasingly, landlords are under pressure to install smoke alarms to avoid the accusation that they are 'failing to fulfil their duty of care towards their tenants'. This is particularly the case for local authorities who, in enforcing checks on private landlords, will have to ask themselves if they too meet the required standards!



It is clear that installing a battery powered smoke alarm unit and thinking that it is sufficient to protect the tenant is an outdated notion. Moreover, even mains powered systems without a reliable long term stand-by cannot be relied upon to provide adequate protection, as landlords cannot guarantee that tenants will never have their power cut off. The implication is clear that some form of stand-by supply (Grade D) is therefore required in tenanted properties.

With BS 5839: Pt.6 now reaching its tenth birthday, it is well established and recognised. There is now every reason to assume that it has significantly more weight behind it than when it was first introduced.

## RAPID REFERENCE GUIDE

### Ionisation Smoke Alarms
- Respond quickly to fast flaming fires, less sensitive to larger smoke particles
- Can be prone to false alarms from cooking vapours so should not be located near to kitchens
- Suitable for general use, appropriate for dining and living rooms and areas where flaming fires could rapidly block an escape route

### Optical Smoke Alarms
- Sensitive to larger smoke particles, more responsive to smouldering fires from foam filled furniture, bedding or burning PVC wiring
- Less vulnerable to false alarms from cooking vapours but more prone to false alarm from dust or insect ingress
- Suitable for general use but most appropriate for circulation areas such as hallways and near kitchens

### Heat Alarms
- Fixed temperature type, temperature range 54° - 62°C. Not prone to false alarms from dust or vapours, but generally less sensitive than smoke alarms
- For use in areas where a conventional smoke alarm is not suitable e.g. kitchens, garages and perhaps living and dining rooms, but

not circulation areas
- Must be interconnected with smoke alarms to provide adequate early fire warning

## LOCATION

- Smoke alarms - within 7.5m of any door to rooms where a fire is likely to start, and within 3m of bedroom doors
- Heat alarms - max 5.3m from any potential source of fire

## LOCATIONS TO AVOID

Do not place a Smoke Alarm in any of the following areas: bathrooms, kitchens, shower rooms, garages or other rooms where the smoke alarm may be triggered by steam, condensation, normal smoke, fumes or excessive dust. Keep the smoke alarm at least 6m away from sources of smoke or vapours that may cause nuisance alarms.

Do not place Heat Alarms in any of the following areas: bathrooms, shower rooms or other rooms where the unit may be triggered by steam or condensation.

Do not place Smoke or Heat Alarms in any of the following areas:
- Places where the normal temperature can exceed 40°C or fall below 4°C e.g. attics, furnace rooms etc. Directly above ovens or kettles as the heat/steam could cause nuisance alarms
- Near a decorative object, door, light fitting, window moulding etc., that may prevent smoke from entering the smoke alarm
- Surfaces that are normally warmer or colder than the rest of the room (for example attic hatches, uninsulated exterior walls etc.). Temperature differences might stop smoke from reaching the unit
- Next to or directly above heaters or air conditioning vents, window wall vents etc., that can change the direction of the airflow
- In very high or awkward areas where it may be difficult to reach the alarm for testing

- Do not locate unit within 1m of dimmer controlled lights and wiring - some dimmers can cause interference
- Do not wire into the same circuit as a dimmer
- Do not locate unit within 1.5m, or route wiring within 1m of fluorescent light fittings as electrical "noise" and/or flickering may affect the unit. Do not wire into the same circuit as a fluorescent light
- Do not locate ceiling mounted units within 30cm of walls or corners
- Do not locate near very dusty or dirty areas, as dust build-up in the chamber can make the unit too sensitive and prone to false alarm
- Do not locate in insect infested areas. Small insects getting into the chamber can cause intermittent alarms



## TESTING & MAINTENANCE

Minimum monthly, recommended weekly

(i)  Check that the green mains indicator light is on (if it is off check circuit breakers, fuses and wiring)

(ii)  Press the test button for at least ten seconds to ensure that the smoke chamber, electronics and sounder are working and that all the alarms that are interconnected are sounding. A red light behind the test button, or on the cover will flash rapidly while the horn is sounding. The alarm will stop soon after the button is released. Do not test with a flame or smoke

(iii)  Check for any sign of contamination such as cobwebs or dust. Smoke alarms must be cleaned regularly. This is particularly true of optical alarms, and alarms placed in dusty areas. Use the narrow nozzle attachment of a vacuum cleaner to remove dust, insects or cobwebs from the sides and cover slots where the smoke enters. Turn off the mains and wipe the cover with a damp cloth. Dry cover thoroughly with a lint free cloth. Other than the cleaning described, no other customer servicing of the product is required. Repairs, when needed, must be carried out by the manufacturer

(iv)  Check the battery annually. Refer to the specific user instructions

(v)  Protect the alarm with the dust cover supplied when any renovation work or redecoration is being carried out. Remove the cover immediately when all work is completed as the alarm will not function correctly with the cover in place. Alternatively, with 'Easi-fit' style alarms, simply remove the detector head in the advised manner

(vi)  Do not paint an alarm or allow paint to contaminate it when decorating

## FALSE ALARMS



These can best be minimised by the careful selection, siting and maintenance of alarms. It is a good idea to specify alarms with a 'hush' (false alarm control) button to temporarily silence false alarms from cooking vapours, steam or excessive tobacco smoke, for example. This facility will also help to reduce the risk of users attempting to disable the alarm by, for example, removing the battery or tampering with the mains.

## LIMITATIONS OF SMOKE ALARMS

- Smoke alarms will not detect a fire if sufficient smoke does not



reach the alarm. Smoke may be prevented from reaching the alarm if the fire is too far away or if the fire is behind a closed door, in a chimney or wall cavity for example, or if prevailing draughts carry the smoke away

- Installing smoke alarms in every room, or a heat alarm in areas where a smoke alarm is not suited, will very significantly improve the probability of early fire detection
- The alarm may not be heard. Once installed in its intended location you should check that you can hear the alarm even with the door closed; this is particularly important to test in the bedroom. If it cannot be heard, install more alarms. Remember mains powered alarms must be interconnected
- Smoke alarms may not detect every type of fire early enough. As stated earlier, ionisation alarms and optical alarms respond differently to the different types of fire. Fire caused by escaping gas, violent explosions or poor storage of flammable liquids can spread too quickly for a smoke alarm to give an early warning
- A heat alarm will not sense smoke and will only trigger when the ambient temperature reaches the range 54°C to 62°C
- Smoke and heat alarms do not last indefinitely. For example, a build up of contamination can cause false alarms, more so in the case of optical smoke alarms. Over a period, depending upon the conditions, the electronic components will degrade. For these reasons, all manufacturers recommend regular testing and replacement after no more than ten years

# Easi-fit DESIGN TECHNOLOGY

*easi-fit*

One of the most significant developments in the design of smoke alarms since the introduction of BS 5839: Pt.6 has been the introduction of new 'Easi-fit' design technology. Easi-fit alarms are exceptionally quick and simple to install, helping to reduce installation costs. Further cost-savings are also made possible because Easi-fit alarms do not require the separate purchase of an additional wiring enclosure or mounting kit. Easi-fit technology is now available on both the 160 series and 140 series detailed below.

## INNOVATIVE DESIGN AND QUALITY FEATURES THROUGHOUT

Whether you chose 160 series alarms with high performance 10 year+ rechargeable lithium back-up power cells, or opt for the 140 series with conventional battery back-up system, the detection technology and build quality remain constant across every unit built by Ei. Because we understand that lives can depend on the performance and reliability of an alarm, even budget units are made to an uncompromising specification.

## Easi-fit 140 SERIES MAINS POWERED ALARMS WITH 9V ALKALINE BATTERY BACK-UP

Designed for applications where the budget is a key consideration and there is no requirement for lithium power cell back-up. The 140 Series provides an alkaline battery back-up instead of rechargeable cells and comprises competitively priced units built to the same high standard as all Ei alarm products. Further cost savings are offered through the use of Ei's innovative and totally unique Easi-fit technology.

## Ei141 Ionisation With Hush
- Responds quickly to fast flaming fires
- Unique and proven long life ionisation smoke chamber
- Alkaline battery supplied already connected to reduce installation errors (does not draw power until alarm is fitted to the mounting plate)

- Hush button for false alarm control
- Interconnects with other Ei Professional mains powered smoke and heat alarms
- Separate mains and warning LEDs
- Time and money saving Easi-fit design
- 5 year guarantee
- Kitemarked to BS 5446: Pt.1: 2000

## Ei144 Heat With Hush
- Ideal for protecting kitchens and areas where smoke alarms are not considered suitable
- Fixed temperature fast response thermistor sensor, range 54° - 62°C
- Alkaline battery supplied already connected to reduce installation errors (does not draw power until alarm is fitted to mounting plate)
- Hush button for false alarm control
- Interconnects with other Ei Professional mains powered smoke and heat alarms
- Separate mains and warning LEDs
- Time and money saving Easi-fit design
- 5 year guarantee
- Kitemarked to BS 5446: Pt.2: 2003

## Ei146 Optical With Hush
- More responsive to slow smouldering fires
- Advanced optical chamber with proven extended life capability. Fitted with insect resistant screen
- Alkaline battery supplied already connected to reduce installation errors (does not draw power until alarm is fitted to the mounting plate)
- Hush button for false alarm control
- Interconnects with other Ei Professional mains powered smoke and heat alarms
- Separate mains and warning LEDs
- Time and money saving Easi-fit design
- 5 year guarantee
- Kitemarked to BS 5446: Pt.1: 2000



## MAINS POWERED ALARMS WITH BUILT -IN RECHARGEABLE LITHIUM CELLS - DESIGNED TO LAST THE LIFE OF THE ALARM

## Why 10 year+ Technology - Rechargeable Lithium Cells

### Highest Capacity
- Over 6 months initial stand-by capacity without mains power
- After 10 years on charge the stand-by capacity is sufficient to power the alarm for over 3 months without mains power

### Very Low Self Discharge
Off charge the cells lose only approximately 2% of their total capacity per year - so even after long periods in storage, the cells could still power a smoke alarm for a considerable length of time prior to recharging (for up to three months after ten years). Cells can be discharged and recharged many times.

### Built-in Tamper Resistant Construction
- Cells are soldered for reliable long term connection
- Terminals are laser welded for high reliability
- No cell maintenance required - cells designed to outlast the life of the alarm

### Safety
The cells have been tested and approved by the British Standards Institute and Underwriters Labs Inc (USA) for use in this application. They have also been comprehensively safety tested both by the manufacturer (Panasonic) and by Ei Electronics.

## Easi-fit 160 SERIES MAINS POWERED ALARMS WITH 10 YEAR+ RECHARGEABLE LITHIUM CELLS

The 160 series offers all the advanced detection capabilities and quality lithium cell back-up afforded by the proven and best-selling 150 series, but combines it with the benefits of Easi-fit design technology and offers a new slimline, rounded shape.

## Ei161 Ionisation With Hush

- Responds quickly to fast flaming fires
- Advanced suppression and calibration technology
- Unique and proven long life ionisation smoke chamber
- Hush button for false alarm control
- Separate mains and warning LEDs
- 10 year+ rechargeable lithium cells back-up designed to outlast the alarm - life expectancy of cells endorsed by Panasonic
- Kitemarked to BS 5446: Pt.1: 2000



## Ei164 Heat With Hush

- Ideal for protecting kitchens and areas where smoke alarms are not considered suitable
- Advanced suppression and calibration technology
- Fixed temperature fast response thermistor sensor, range 54° - 62°C
- Hush button for false alarm control
- Separate mains and warning LEDs
- 10 year+ rechargeable lithium cells back-up designed to outlast the alarm - life expectancy of cells endorsed by Panasonic
- Kitemarked to BS 5446: Pt.2: 2003

## Ei166 Optical With Hush

- More responsive to slow smouldering fires
- Advanced suppression and calibration technology
- Large volume high performance optical chamber with proven extended life capability. Fitted with insect resistant screen
- Hush button for false alarm control
- Separate mains and warning LEDs
- Auto self-test feature continually monitors the sensor every 40 seconds for additional safety
- 10 year+ rechargeable lithium cells

back-up designed to outlast the alarm - life expectancy of cells endorsed by Panasonic
- Kitemarked to BS 5446: Pt.1: 2000

## THE 150 SERIES MAINS POWERED ALARMS WITH 10 YEAR+ RECHARGEABLE LITHIUM CELLS

Advanced detection technology coupled with superior 10 year+ rechargeable lithium cell back-up has made the 150 Series the market leader and the first choice for specifiers nationwide.

The 150 Series popularity and reliability is proven by the fact that several million units have now been installed and are currently protecting households throughout the UK.

## Ei151TL Ionisation With Hush

- Responds quickly to fast flaming fires
- Unique and proven long life Ei ionisation smoke chamber
- Easy to use Test and Hush buttons
- Separate mains and warning LEDs
- Low power cell warning in the event of a mains or cell failure
- Precision charging circuit ensures peak cell performance
- Proven 10 year+ rechargeable lithium cell back-up
- Kitemarked to BS 5446: Pt.1: 2000

## Ei154TL Heat

- Ideal for protecting kitchens and areas where smoke alarms are not considered suitable
- Fixed temperature fast response thermistor sensor, range 54° - 62°C
- Separate mains and warning LEDs
- Low power cell warning in the event of a mains or cell failure
- Precision charging circuit ensures peak cell performance
- Proven 10 year+ rechargeable lithium cell back-up
- Kitemarked to BS 5446: Pt.2: 2003

## Ei156TLH Optical With Hush

- More responsive to slow smouldering fires
- Features the large, advanced Ei optical chamber with proven extended life capability, fitted with

insect resistant screen
- Separate mains and warning LEDs
- Hush button for false alarm control
- Low power cell warning in the event of a mains or cell failure
- Precision charging circuit ensures peak cell performance
- Proven 10 year+ rechargeable lithium cell back-up
- Kitemarked to BS 5446: Pt.1: 2000



## DISPOSAL

All ionisation smoke alarms contain a small amount of radioactive material (Americium 241). The radiation from this source is over 10,000 times less than natural background radiation from the ground, buildings and outer space.

Experts have stated that the risk is minuscule - the equivalent of moving to the floor above and being that much closer to the sun! The National Radiological Protection Board carries out extensive tests on ionisation smoke alarms and have concluded that they are radiologically safe. They also consider that it is safe to dispose of old smoke alarms in normal household rubbish, at the rate of one per bin of household refuse.

Please note that there are no special disposal requirements for the lithium cells used as back-up in Ei mains powered alarms as they do not contain any regulated materials.

# RadioLINK

## FOUNDATION OF THE COMPLETE SOLUTION TO RESIDENTIAL FIRE DETECTION

The use of radio interconnection in Grade D alarm systems means that it is much easier to comply with the extended alarm coverage recommended in BS 5839: Pt.6: 2004.   With no interconnect wiring required, the contractor and specifier can agree fixed costs, allowing a quicker, simpler and more cost effective solution to smoke and heat alarm installation programmes.



Based on proven wireless technology, RadioLINK from Ei provides a quality mains powered wireless interconnect solution. The Ei168 RadioLINK base can be used with either Ei140 or Ei160 Easi-fit alarms, plus ancillary products thereby combining proven quality detection capability and performance with proven wireless technology.

## Ei168 RadioLINK Base



- Mains powered
- Easy to install - simply fits underneath each alarm
- Unique coding to prevent interference

- Fitted with rechargeable lithium cells to last in excess of 10 yrs
- Up to twelve alarms on one system
- Programmable repeater function for more difficult applications
- Wide range of compatible accessories

## RADIOLINK ANCILLARY PRODUCTS

### Ei428 Remote Relay Module



- Mains powered
- Easy to install
- For use with 140 and 160 series alarms on an Ei168 RadioLINK base
- Unique coding to prevent interference
- Rechargeable 10 yr+ cell back-up enables the relay to be operational even in a mains failure – ideal for Warden Call Systems and Alarm systems for the deaf and hard of hearing
- 5 amp relay with volt free contacts
- Switchable to constant or pulse operation

### Ei411 Wireless Remote Control - Wall Mounted Switch



- Allows testing of the system at

ground level
- Allows easy identification of the site of a fire, or the location of a false alarm
- No wiring required
- Neat appearance – same size as a 2 gang light switch
- Fitted with long life 10 yr+ lithium cells
- No battery replacement required
- Unique coding to prevent interference
- For use with 140 and 160 series alarms on an Ei168 RadioLINK base

### Ei410 Wireless Remote Control – Hand Held



- Same features as the Ei411 but is a key fob size designed for personal use.

### Ei407 Wireless Manual Call Point



- Allows manual testing of the system
- Allows manual alarm to warn other occupants
- Same size as a standard Manual Call Point
- No wiring required
- Fitted with long life 10 yr+ lithium cells
- No battery replacement required
- Unique coding to prevent interference
- For use with 140 and 160 series alarms on an Ei168 RadioLINK base

# ANCILLARY FIRE DETECTION PRODUCTS

## ALARM SYSTEMS FOR THE HEARING IMPAIRED

Residents with hearing difficulties require a different approach to fire protection. The Ei Professional Alarm for the hearing impaired is currently the only unit on the market made by an experienced smoke alarm manufacturer. Comprising a powerful strobe light and vibrating disc, the unit is available with a mains powered control panel and either 230V or 9V smoke alarm options with full battery back-up.



- High intensity integral strobe
- Can be interconnected with up to twelve alarms
- Plug in or wire in options
- Easily installed
- Test buttons
- Auxiliary socket
- Self-diagnostics for extra safety
- Remote trigger facility

- Alarm clock input
- Can be used with RadioLINK

Ei169 - Control box with integral strobe, vibrating pad and cable for connections, for use with the 150 series alarms (not supplied).

EI169/160 - As above for use with 160 Series alarms (not supplied).

Ei169RF - Comprises control box with a RadioLINK transceiver, integral strobe, vibrating pad and cable for connections. Only suitable for use with smoke and heat alarms using an Ei168 RadioLINK base. Other RadioLINK control devices can be used with this model. RadioLINK base and smoke/heat alarm not supplied.

Ei175 - Supplied with low voltage Ionisation Smoke Alarm.

Ei176 - Supplied with low voltage Optical Smoke Alarm.

Ei176RF - Comprises control box with a RadioLINK transceiver, integral strobe, vibrating pad and cable for connections. Supplied with RadioLINK Ei3105RF optical smoke alarm. Other RadioLINK control devices can be used with this model.
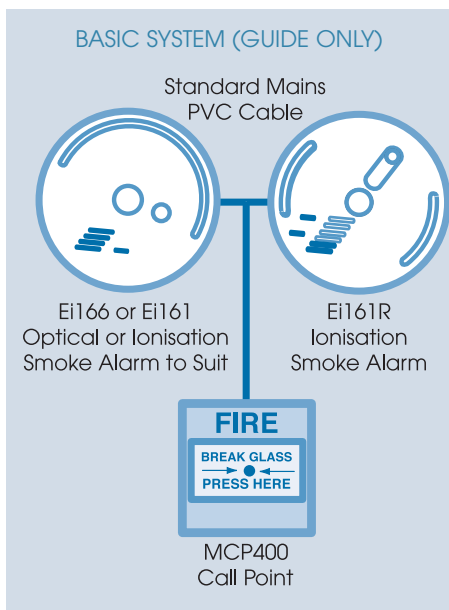
# MODIFIRE

A Modifire system is exceptionally simple to design and install, thanks to its modular design and unique Easi-fit technology. Just tailor the system to meet the needs of the premises. The Ei161R ionisation or Ei166R optical alarm with rechargeable back-up provides the starting point. Then you can add extra alarms, call points and locator switches as required, all interconnected with PVC mains wiring cable. Only one 'R' unit - Ei161R or Ei166R - is necessary for each system.
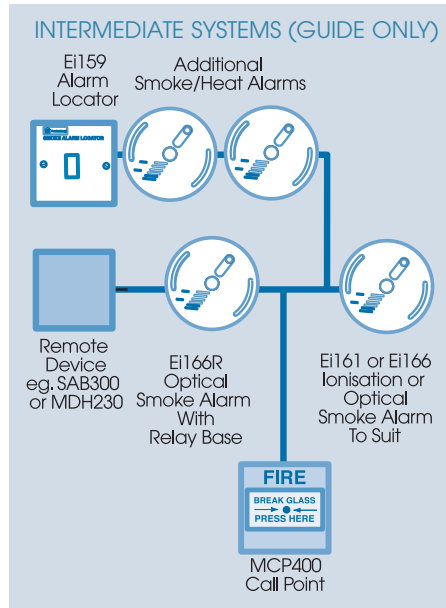
## BASIC SYSTEM (GUIDE ONLY)

- System to cover escape routes only
- Choose from Ei161R ionisation or Ei166R optical alarms
- Connect Manual Call points MCP400 into the circuit



BASIC SYSTEM (GUIDE ONLY)

Standard Mains PVC Cable

Ei166 or Ei161 Optical or Ionisation Smoke Alarm to Suit

Ei161R Ionisation Smoke Alarm

FIRE
BREAK GLASS
PRESS HERE

MCP400 Call Point

## INTERMEDIATE SYSTEM (GUIDE ONLY)

- System to cover escape routes AND high risk areas
- Install Ei161R or Ei166R alarm and add further ionisation (Ei161), optical (Ei166) and heat alarms (Ei164) as required to a maximum of 20 alarms. The Ei128R relay base counts as one alarm
- Connect into the circuit Manual Call Points MCP400 as required
- Connect into the circuit Alarm Locator Switches Ei159 as required
- Mount an Ei128R or Ei128RBU relay base behind the 'R' unit to signal warden call devices, strobes, sounders etc

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INTERMEDIATE SYSTEMS (GUIDE ONLY)



Ei159 Alarm Locator

Additional Smoke/Heat Alarms

Remote Device eg. SAB300 or MDH230

Ei166R Optical Smoke Alarm With Relay Base

Ei161 or Ei166 Ionisation or Optical Smoke Alarm To Suit

FIRE
BREAK GLASS
PRESS HERE

MCP400 Call Point

## MCP400 Manual Call Point



- For use with Ei151TLR, Ei156TLR, Ei161R, Ei164R or Ei166R alarms
- Supplied complete with surface mount box
- Testing key supplied
- Supplied with non-breakable operating element
- Suitable for use with Modifire
- LPC approved, conforms to BS EN 54-11

## Ei159 Smoke Alarm Locator Switch



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This convenient unit allows the user to locate the precise source of an alarm in installations comprising three or more units. Pressing the locator button stops all the alarms sounding except for the one that was the source of the alarm.

- The ideal way to quickly and easily find the source of any alarm
- Easy to install
- Ideal for larger premises and HMOs
- Auto reset within ten minutes
- Minimises disturbance to other residents
- Suitable for use with any of the 140, 150 and 160 series alarms

## Ei128R Relay Base - mains powered only



- For use with 140 and 160 series
- Surface Mount Kit or pattress
- 5 amp relay with volt free contacts
- Switchable for constant or pulse operation
- Allows signalling to door closers, sounders, strobes etc
- Suitable for use with Modifire

## Ei128RBU Relay Base - mains with rechargeable back-up

- For use with 140 and 160 series
- 5 Amp relay with volt free contacts
- Switchable for constant or pulse operation
- Features rechargeable lithium back-up cells with 10 yr+ life
- Ideal for signalling to devices not affected by a mains failure, such as Warden Call Systems

## SAB300 Remote Strobe Xenon Beacon



- Mains powered
- For internal or external use
- Flash energy of 3 watts and flash frequency of .9Hz
- Clear or red lens options
- For operation via an Ei158R or Ei128R relay
- Suitable for use with Modifire

## SABV4 High Intensity Strobe Xenon Beacon



- Mains powered
- Ideal for use where standard strobes may not be sufficiently visible
- 5 joule high intensity flash
- Low current consumption
- Red or opal lens option
- For operation via an Ei158R or Ei128R relay
- Suitable for use with Modifire

## YO3 Remote Sounder

A powerful mains operated sounder ideal for use in areas where a warning is required - but a detector isn't.
- Mains powered
- For internal or external use IP54
- Offers a range of switchable sound frequencies from 500Hz to 2900Hz
- Switchable sound outputs from 97-100dB(A)

- For operation via an Ei158R or Ei128R relay
- Suitable for use with Modifire

## MDH230 Magnetic Door Holder



- Mains powered
- Automatically releases a fire door in the event of a fire
- Test/Override button feature
- Holding capacity of 11.3kg
- Low current consumption
- For operation via an Ei158R or Ei128R relay
- Suitable for use with Modifire

## Ei127 Surface Mount Kit



- For 140 and 160 series alarms
- For use on uneven ceilings
- Useful for applications involving complex wiring

## Ei152 Remote Test & Hush Switch



The Remote Test and Hush Switch is specifically designed for use with the Ei151TLR, Ei156TLR, Ei161R, Ei164R or Ei166R alarms.
- Tests alarms or silences false alarms (only on 'R' models in the system) without the need to reach the alarm itself
- Ideal for the infirm or elderly
- Wall mounted
- Easy to use - large clear red buttons
- Suitable for use with Modifire

## Ei167 Remote Sounder



The Remote Sounder can be used for interconnection with any Ei mains powered alarm. It contains no smoke sensor itself, but is triggered by a signal from the interconnect circuit. It is ideal for use where an alarm - but no detection - is required.
- Wall or ceiling mounted
- Integral rechargeable lithium cell back-up
- Interconnects with all mains operated smoke and heat alarms
- Manual test button
- AC mains indicator light
- 85dB(A) alarm at 3m
- Suitable for use with Modifire

## SAT332 Smoke Alarm Tester



This useful device - used in conjunction with an SAA300 aerosol of synthetic smoke - is the only reliable method of testing the smoke chamber on ionisation and optical alarms.

• Safe and easy to use
• Synthetic smoke is non-flammable and environmentally friendly

## Ei115 Anti-Vandal Cage



• Fits all Ei alarms
• Screws on to the ceiling
• Test and Hush buttons can be easily accessed
• Measures 170 x 170 x 95mm

## LOW VOLTAGE 180 SERIES ALARMS

Ionisation - Model Ei181
Optical - Model Ei186
Heat - Model Ei184
• Supply voltage 10.5 to 30 volts
• Power on indicator
• Interconnect up to twelve alarms
• Alkaline battery back-up
• Hush feature on all models
• Relay contacts selectable for continuous or pulse operation

## 9 Volt Alarms With 10 year+ Life Lithium Battery Cells



Both of these alarms are supplied with tamper-resistant, non-replaceable 10 year life lithium battery cells to meet the requirements for a  BS 5839: Pt.6, Grade F system for single storey tenanted properties.

Ei100TYC-  Ionisation with 10 year+ life Lithium battery, false alarm 'silencer' button and interconnect.

Ei3105TYCH-  Optical with 10 year+ life lithium battery, false alarm 'silencer' button and interconnect.

Up to twelve Ei100TYC and Ei3105TYCH may be interconnected.

## Carbon Monoxide Protection

Ei Electronics is an acknowledged leader in the field of mains and battery powered Carbon Monoxide alarms. Please contact us for more information.

## Ei SMOKE ALARMS - THE FIRST CHOICE FOR LOCAL AUTHORITIES AND HOUSING ASSOCIATIONS NATIONWIDE

Ei Professional smoke alarms and ancillary products have been specified by literally hundreds of Local Authorities and Housing Associations in England, Scotland, Wales and Northern Ireland as the products of choice for their retrofit programmes. Many of these would be pleased to discuss their experiences of product reliability and after sales support with interested parties. Please contact our Customer Services Department for further information.

In addition, many builders, architects and installers recognise the benefits of fitting smoke and heat alarms that have proven to be extremely reliable in many thousands of 'New Build' installations throughout the UK.

## TECHNICAL SUPPORT

Our highly trained and experienced staff in the Customer Services Department will be pleased to assist you with any queries that you may have regarding installation, maintenance, or product specification. Telephone 0870 758 4000 and ask for Customer Services.

Sections of BS 5839: Pt.6: 2004 are reproduced with the permission of BSI. A complete edition of the standards can be obtained by post from: BSI Customer Services, 389 Chiswick High Road, London W4 4AL.

For more detailed information on our range of smoke, heat and Carbon Monoxide alarms, please ask for a copy of our latest product brochure.

## AICO ON THE WEB

If you haven't already looked us up, you'll find that the Aico web site at www.aico.co.uk is well worth a visit, with detailed technical information on our unrivalled range of products and guidance on the installation of key products. It's a valuable resource for specifiers, contractors and wholesalers alike, and it's being continually updated to bring you the very latest additions to our range as they arrive.

## TROUBLE SHOOTING

Please Note: many alarms that are returned to Aico as "faulty" are found to have circuit damage. This is largely due to incorrect wiring on installation. Although all mains powered smoke alarms are double insulated, mixing live and neutral will damage interconnected alarms. This damage can also occur if the connector plug momentarily short circuits across the power pins when installation takes place with the power on. It is essential that live and neutral wires are correctly identified and that all connections are made before the mains power is switched on!

All smoke alarms, but more particularly the optical type, are prone to dust and insect ingress which can cause false alarms. The latest design, materials and manufacturing techniques have been used in the construction of our alarms to minimise the effects of contamination. However, it is impossible to completely eliminate the effect of dust and insect contamination. Therefore, to prolong the life of the smoke alarm it must be kept clean so that excess dust does not build up. Any insects or cobwebs in the vicinity of the smoke alarm should be promptly removed. In certain circumstances, even with regular cleaning, contamination can build up in the smoke sensing chamber causing the alarm to sound. If this happens, the alarm must be returned for servicing or replacement. Contamination is beyond the manufacturer's control, and is considered normal wear and tear.

This list is not comprehensive. You should refer to the specific user instructions that accompany each product for further guidance.

| Problem | Solution |
|---|---|
| Alarm sounds for no apparent reason | Identify the alarm source. The red LED under the test button or on the cover will flash rapidly only on the unit which is the source of the alarm. Press hush button if fitted. Check for fumes, steam etc. from the kitchen or bathroom (paint and other fumes can cause nuisance alarms). Fan the alarm vigorously with a newspaper to disperse fumes. If alarm does not stop, switch off mains and remove the unit with the rapidly flashing red LED. |
| Alarm beeps continuously (approx once per minute) | Alarm may be in 'hush mode' (Ei150, 151TL & 151TLR only). Cells (150 & 160 series) or batteries (140 series) may be depleted. Check the green mains light is on. If not, check fuse, circuit breakers and wiring connections. 140 series - the battery may require replacement. Switch off the mains supply, remove the alarm and replace battery. 150 & 160 series - the cells may require recharging. This will occur automatically if the mains power is connected. The cells are not replaceable. If all the above actions have not silenced the beeping, there may be a fault. Switch off the mains and replace the unit. |
| Interconnected alarms do not all sound | Hold test button for ten seconds to ensure that the signal is transmitted to all alarms on the system. Switch off the mains power and check that the live, neutral and interconnect wires are tight and have been correctly connected on all alarms in the system. Incorrect wiring will damage alarms. |
| Frequent nuisance alarms occur | Ensure the kitchen and bathroom doors are closed when in use. Ensure that the alarm is sited at least 6m away from sources of fumes. Contamination from insects, dust, paint etc. may have occurred; clean the alarm. If the problem persists, resiting of the alarm should be considered. Alternatively, changing to a model with a different sensor type may resolve the problem. |

# A Guide to
# Residential Fire Detection

## With Reference to BS 5839: Pt. 6: 2004

RadioLINK

Ei Professional®

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